Social Science & Medicine 140 (2015) 1–8



Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed



Evaluating consumer preferences for healthy eating from Community Kitchens in low-income urban areas: A discrete choice experiment of Comedores Populares in Peru



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ARTICLE INFO

Article history:
Received 3 November 2014
Received in revised form
10 June 2015
Accepted 24 June 2015
Available online 3 July 2015

Keywords:
Peru
Best-worst discrete choice experiment
Obesity
Low-income
Food program
Nutrition policy
Comedores Populares

ABSTRACT

Many low-income individuals from around the world rely on local food vendors for daily sustenance. These small vendors quickly provide convenient, low-priced, tasty foods, however, they may be low in nutritional value. These vendors serve as an opportunity to use established delivery channels to explore the introduction of healthier products, e.g. fresh salad and fruits, to low-income populations.

We sought to understand preferences for items prepared in *Comedores Populares* (CP), government-supported food vendors serving low-income Peruvians, to determine whether it would be feasible to introduce healthier items, specifically fruits and vegetables.

We used a best-worst discrete choice experiment (DCE) that allowed participants to select their favorite and least favorite option from a series of three hypothetical menus. The characteristics were derived from a series of formative qualitative interviews conducted previously in the CPs. We examined preferences for six characteristics: price, salad, soup, sides, meat and fruit.

A total of 432 individuals, from two districts in Lima, Peru responded to a discrete choice experiment and demographic survey in 2012. For the DCE, price contributed the most to individual's utility relative to the other attributes, with salad and soup following closely. Sides (e.g. rice and beans) were the least important. The willingness to pay for a meal with a large main course and salad was 2.6 Nuevos Soles, roughly a 1 Nuevo Sol increase from the average menu price, or USD $0.32 dollars. The willingness to pay for a meal with fruit was 1.6 Nuevo Soles.

Overall, the perceived quality of service and food served in the CPs is high. The willingness to pay indicates that healthier additions to meals are feasible. Understanding consumer preferences can help policy makers design healthier meals in an organization with the potential to scale up to reach a considerable number of low-income families.

1. Introduction

Many individuals from around the world rely on fast foods for daily meals, such as large chains in developed countries, or street vendors and small food stalls in low-income countries. The consumption of less healthy fast food has grown as the numbers of urban poor in developing countries has also increased. Other factors associated with economic development have also increased reliance on cheap, quick meals, including longer commutes, longer work hours, and higher numbers of low paying jobs (Roever, 2006). The advantages of fast-food vendors include low prices, convenience, freeing time for leisure alternatives activities and the food usually tastes good. However, these foods may be high in fat, calories and salt, contributing to long-term health problems. One of the major risk factors for cardiovascular disease is obesity, and in

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http://dx.doi.org/10.1016/j.socscimed.2015.06.033
0277-9536/

Peru, nearly half the population is overweight and 16% are obese (WHO, 2011; Miranda et al., 2011).

Food assistance programs play a dual role in helping low-income individuals access food at lower prices, as well as trying to improve the nutritional quality of food. In Peru, Comedores Populares (Community Kitchens) provide subsidized meals for low-income individuals. This system is both an economic development and nutrition program, and is one of the main providers of food to low-income families. Low-income women established the CPs in 1978 in response to rising poverty (Benavides, 2005). In the early 2000s, this number grew to more than 15,500 Comedores Populares in Peru, and a third are in Lima, the country's capital city (Blondet and Trivelli, 2004). Nearly 100,000 women cook meals for roughly 6% of Lima residents (Blondet and Trivelli, 2004). The national food assistance program (PRONAA) used to subsidize about 30% of the ingredients such as rice, legumes (e.g. beans), oil and canned fish (Alcázar, 2004), but now the local municipalities subsidize the meals. Any additional items are purchased with daily sales revenues.

Other research in Peru has shown that individuals on food assistance programs have a higher prevalence of obesity, and the consumption of fast foods is high and the consumption of fruits and vegetables is low among the urban poor in Lima. The meals served in the CPs rarely contain fruits or fresh vegetables and are high in carbohydrates (Chaparro et al., 2014; Ministerio de Salud: Lima, 2006; Grupo de Opinión Pública, 2009). Portions of food served in CPs are usually excessive, particularly in the cheaper items such as rice, beans, potatoes or noodles, and because they are intended to serve multiple family members. While the items themselves are prepared fresh daily in each CP, they are high in carbohydrates and it is unclear the extent to which the CP meals may be high in salt or fat. They could be potentially lower in fat than deep-fried fast foods. The prices are also very low because of the government subsidy. From about 1.5 Peruvian Nuevos Soles, the basic meal usually consists of a soup with some other side item like rice, beans, potatoes or pasta. Only occasionally is there meat, and almost never are there fruits and fresh vegetables. Prices can vary as CPs are run independently by the local communities and some members pay lower prices than others. There is also wide variation in the quantity and quality of the meals, but common to almost all CPs is the lack of fruits and fresh vegetables.

Due to the existing lack of fruits and fresh vegetables across the CPs in terms of meal preparations, it is difficult to understand preferences for healthier foods among the low-income using observational data. Discrete choice experiments (DCE) are a useful way to provide stated preferences for hypothetical choices, before they are implemented. They have been used previously to determine preferences for food products (Louviere, 1984; Loureiro and Umberger, 2007) and more recently in obesity prevention (Grisolía et al., 2013). We contribute to the literature not only on the topic of nutritional food programs and their impact on obesity, but also in applying a multi-profile best-worst version of a DCE to this context. While DCEs have been used in many applications in health (e.g. Ryan and Gerard, 2003; Lancsar and Louviere, 2008), few multi-profile case best-worst experiments have been conducted, though interest in them is growing (Fiebig et al., 2011; Potoglou et al., 2011; Yoo and Doiron, 2013).

The objective of this study was to understand preferences for elements of meals prepared in CPs, to understand whether it would be feasible to introduce healthier items such as fruits and vegetables, to low-income populations. The results of this study will inform a nutritional intervention for the CPs as part of a larger project to improve nutrition among Peru's urban low-income residents.

2. Methods

2.1. Experiment overview

We conducted a multi-profile case best-worst scaling experiment among low-income customers of CPs in two districts in Lima, Peru. The best-worst types of DCE allow for a complete ranking of choices, and therefore elicits more preference information than if each respondent had only picked their first choice (Lancsar et al., 2013). These types of DCEs are called a ‘case 3’ type to differentiate them from other best-worst analyses that ask respondents to select among levels of particular characteristics (cases 1 and 2), rather than full products such as a food menu (Flynn, 2010). Respondents in our study selected their favorite, then least favorite option from three menus (profiles) presented. The characteristics of the menus were selected after a qualitative component with users and cooks in the CPs that is explained in greater detail below. After the experiment, the respondents also answered a demographic questionnaire that included a variety of opinion questions on the CPs. The institutional review board of Universidad Peruana Cayetano Heredia in Lima, Peru approved this study.

2.2. Attribute development

The menu characteristics for this study derive from a series of qualitative interviews conducted as part of the first stage of the project. The qualitative study aimed to understand suppliers' and consumers' current practices and views in relation to what foods are being purchased, prepared and offered; what factors are most influential in defining the menus; and, what are the most and least valued characteristics of Comedores Populares. The study was conducted and completed between July and December 2012.

The qualitative component of the study included visit to four Comedores Populares, two in San Juan de Miraflores and two in Cercado de Lima. The collection of data incorporated interviews to members of the CPs, current consumers and nearby residents who do not use the CPs. In total, 20 members of Comedores, 24 regular consumers, and eight residents but non-users of Comedores were interviewed. It also incorporated information on four in-depth observations of Comedores, daily from 8:00a-3:00p, with durations of 5 days.

During the qualitative interviews, we confirmed that fruits and fresh vegetables were absent of CP's menus but were highly valued by both members and consumers, so we included these as attributes in the DCE. The other attributes selected represent the basic elements served in the CP meals such as soup, rice and beans. Meat is also highly valued, but is offered less often so this was also included as a menu item in the DCE. CP members and consumers did not perceive that CP menus were high in fat or sodium so these attributes were not included in the DCE experiment.

We examined preferences for six characteristics: price, salad, soup, sides (rice and beans), meat and fruit. The levels were none (for some), small, medium (for some) and large portions for the food characteristics and 1.5, 3 and 6 soles for the price (Table 1). The lowest price level represents approximately the current cost of the meals, though we acknowledge that some consumers can face different prices. The upper price levels are designed to measure whether there is an increased willingness to pay for additional items such as fruit or salad.

2.3. Choice task

The respondents were recruited and surveyed in May and June 2013. Customers in the sample were invited to participate consecutively from 24 CPs in Cercado de Lima, and 24 CPs in San Juan de

Table 1
Menu characteristics and levels used in the experiment.

Menu characteristic	Levels	Spanish translation
Price	1.5, 3, 6	Nuevos Soles (Peruvian currency)
Salad	none, medium, large	ensalada
Soup	none, medium, large	sopa
Sides (beans and rice)	small, medium, large	segundo
Meat	none, one portion, two portions	carne
Fruit	none, one fruit, two fruits	fruta

Miraflores in a convenience sample. We obtained half the responses in Cercado and half in San Juan de Miraflores—two urban districts in Lima. We interviewed the customer during his/her visit to the CP if the person was over 18 years of age and if the person was willing to, consented and available to answer the survey in the site. In case a consumer was not able to complete the survey, we asked to reschedule. On average, the interview took 18 min (SD: 5 min).

We used a multi-profile case best-worst discrete choice experiment that allowed participants to select their favorite, then select their least favorite option from a series of three hypothetical meals. The design of the 72 profiles (one profile is a set of three menus) used in the experiment was constructed using SAS algorithms for creating discrete choice experiment designs (Kuhfeld, 2005). The 72 profiles were then blocked into nine groups of eight choice sets, with three profiles per choice set (Fig. 1). Fig. 1 shows an example of the choice set presented to respondents. The items on the menus are examples and it was explained to respondents that the meat and sides could be other items such as pork or potatoes. Respondents were randomly assigned into groups, so that each group answered 8 profiles, so not everyone had to answer all questions. The number of choices per respondent was kept small so as not to burden the participants, given the income and educational levels of the districts. The best practices for DCEs establish that the number of characteristics and their levels sorted into a feasible number of combinations (Bridges et al., 2011). After viewing the choices, respondents were also offered the option of choosing none of the above (i.e., opting out) if they would have chosen not to eat at the CP, given the three menus presented. The opt-out allows for the estimation of unconditional demands. DCEs assume that a person's choices are conditional on choosing to eat in the CP. In reality when faced with a set of choices, a respondent may decided that they are all poor options, and go elsewhere.

2.4. Demographic and opinion survey

After completing the choice task, respondents were asked a variety of demographic, health status and health behavior questions. Respondents were also asked about their opinions in terms of prices, quality, access and other attributes of the CP in which they were invited to participate. The characteristic information provided in this portion of the survey allows us to perform subgroup analyses according to demographic characteristics such as gender and whether they were doing health improving activities such as lowering salt intake or exercising.

Demographic questions included gender, educational level and marital status. Respondents were asked about household financial status, income and employment. Health questions included smoking status, self-reported health, height and weight. They were also asked if they had been diagnosed with key chronic diseases: diabetes, high blood pressure, high cholesterol, heart disease and stroke. In addition to the demographic questions, we asked respondents whether they had done any health-promoting behaviors in the last month such as increasing physical activity, losing weight or reducing the consumption of fatty foods. Lastly, the respondents were asked about their perceptions of the quality of food prepared at the CPs, the flavor, the portions, the prices and the frequency of which they use the CP.

2.5. Econometric analysis

Discrete choice experiments have their foundation in random utility theory (McFadden, 1974), where the preference for a given alternative is the sum of the relative weights of the different characteristics. The model is written as follows:

$$U_{isq} = V_{isq} + \varepsilon_{isq}$$

U is person *i*'s utility for item *q* that is part of choice set *s*. Their utility is comprised of a systematic part, V_{isq} and an error part, ε_{isq}. Individual *i* will select item *q* only if their utility from q is greater than the utility associated with all other items in the choice set. Using a linear indirect utility function, the systematic part can be a function of the characteristics of the *q*th good (X'_{isq}).

$$V_{isq} = X'_{isq\gamma}$$

The relative utility of the characteristics was derived using conditional and rank-ordered logit models. We used effects coding for the levels of the menu characteristics, where the lowest level was coded as a negative one, the middle level as zero and the upper level as positive one. The rank-ordered logit models use a full ranking of alternatives. The conditional models serve as sensitivity analyses, using the best choice or the worst choice, to confirm the direction of the rank-ordered choices. The outcome is the selection of the ordering of preferences. The independent variables are the characteristics of the menus. Because each respondent has multiple observations in the data, some describe choice data as having a panel nature. To account for the within-person correlation, we clustered the standard errors on the person.

The rank-ordered logit model does present some estimation problems as noted by Yoo and Doiron (2013). Yoo and Doiron highlight that the rank-ordered logit may yield lower bound estimates for the contribution of the various characteristics to an individual's utility function. The estimates may be lower in this type of model because individuals may be very certain of their first choice, but may make more error when asked to make the second choice. When the error component is larger, the coefficients will be smaller. Despite these cautions, we use the rank-ordered logit model as a relatively easy way to communicate the results to policy makers, following Lancsar et al. (2013). The authors describe a variety of models to estimate the coefficients on the given good's attributes, and the simplest models are the conditional logit to model the first-best choice, or the rank-ordered logit to estimate the full ranking. Our goal is not to add to the methodology in the best-worst discrete choice literature, but to apply the method to a policy problem and present policy solutions.

Additionally, three subgroups were analyzed for the DCE: by gender, district and whether the person had reported doing at least one healthy behavior such as eating more fruits and vegetables. This is equivalent to interacting the individual characteristics with the menu characteristics. We anticipated that perhaps those doing

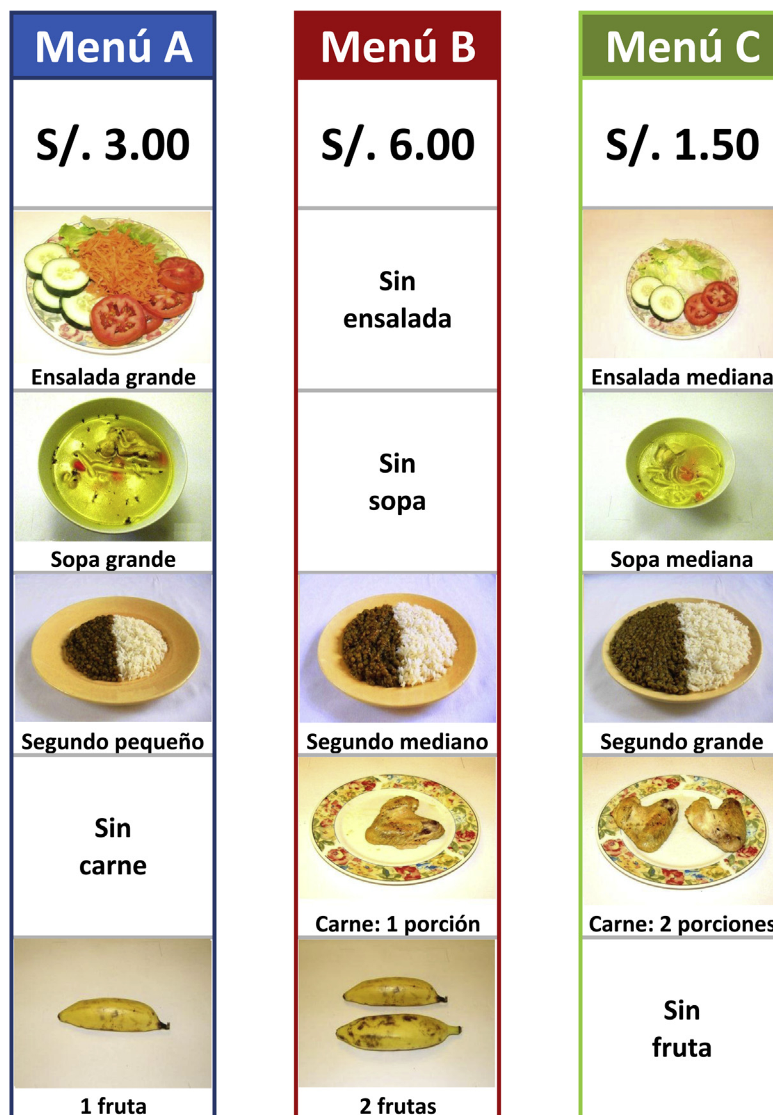


Fig. 1. Example card shown to respondents.
Note: Prices in Peruvian Nuevos Soles.

healthy behaviors such as limiting salt intake may be willing to pay more for healthier CP meals. We thought there may be differences in preferences from those who lived in different districts, for those already doing some type of healthy behaviors, and potentially gender. The goal of the DCE is to find out whether the consumers of willingness to pay for added benefits, and we thought the preferences for certain characteristics might be higher for some groups. In addition, we also conducted a further sensitivity analysis for those that selected the opt-out question. However, the number of individuals selecting the opt-out question was so small, that we decided not to present these results. All analyses were conducted with STATA 12 (StataCorp, 2011).

3. Results

3.1. Descriptive results

432 individuals were surveyed from 48 CPs in two districts in Lima, Peru. 24 CPs in Cercado de Lima and 24 CPs in San Juan de Miraflores were surveyed. The CPs ranged in the number of partners (other cooks) from 7 to 30, serving anywhere from 25 to 150 meals per day. Our sample is a convenience sample of the CPs and is not representative of the district as a whole. 77% of the respondents were females with an average age of 43.7 (SD: 14.5). The sample had 9.2 years of education on average (SD: 3.4), which is less than the 11 years of school necessary to complete secondary school. Respondents had an average of 4.4 household members (SD: 2.1). Nearly 60% report either being married or living together with their partner. 47% are self-employed, while 40% report doing household work such as cooking, cleaning or childcare, and are thus likely to not generate income. 80% of the sample has a household income of less than 1000 soles per month, about $323 USD (Table 2). The minimum wage for the area is 750 Nuevos Soles placing the majority of the sample making under or just above the minimum (Trading Economics, 2015).

3.2. Demographic survey results

Table 3 shows a variety of summary statistics related to the health status of the participants and their perceptions of the CPs. The average body mass index, calculated from self-reported weight and height, was 26.7 Kg/m2 (SD: 4.8), which is overweight.

Table 2
Characteristics of participants.

Full sample characteristics, n = 432		
	Mean	SD
Age	43.7	14.5
Years of education	9.2	3.4
Number of household members	4.4	2.1
Number of household members under five years-old	0.6	0.8
Number of household members over 65 years-old	0.2	0.5
Number of women in the household	2.1	1.3
	N	%
Gender, female	333	77
Employment status, last 6 months		
Employed	49	11
Self-Employed	202	47
Work at Home	176	41
Student	1	0
Other	3	1
Household Monthly Income, Nuevos Soles		
<250	44	10
251–500	97	23
501–750	115	27
751–1000	92	22
1001–1500	49	11
1500+	32	8
Mother tongue		
Spanish	349	81
Quechua	79	18
Aymara	3	1
Other	1	0
Marital status		
Married	111	26
Living together	143	33
Separated	66	15
Divorced	2	1
Widowed	20	5
Single	90	21

Respondents reported an average self-reported health status of 2.3 on a scale from 0 to 4 with zero being the worst and four being the best health (SD: 0.7). In terms of health status, 18% reported having hypertension and 20% high cholesterol. Anywhere from 19 to 34% of the sample reported doing some kind of activity to improve their health in the last four weeks, including eating more fruits and vegetables or trying to lose weight. 19% reported exercising more while 34% reported trying to use less fat. 28% are trying to eat more vegetables. More women (83%) report having done a healthy behavior in last four weeks than men (67%).

Nearly half of the respondents use the CP every day. 70% report they add other vegetables or eggs to the meals they receive. 34% of respondents thought the nutritional quality of the meals was good or very good and 84% reported that CP was close or very close to their homes. 83% report always paying for their meals while 17% say they pay unless they are cooking that day. The average number of meals bought by the consumer in the CP is 3.3 (SD: 1.8). The average price paid for each menu was 1.9 Nuevos Soles ($0.50 USD) with a range of 1–3 Nuevos Soles.

3.3. Best-worst results

All 432 respondents completed the BW-DCE. The number of observations is 10,368, which is equivalent to 432 individuals completing 8 choice tasks, each with 3 rankings (432*8*3). For the DCE, price was the factor with the most relative importance in contributing to an individual's utility, compared with the other coefficients. Salad and soup followed closely. The coefficients from the rank-ordered estimation results can be interpreted as the relative utility value of the given attribute compared to the other attributes in the menu. The respondents valued more highly the soup and salad attributes than the meat or fruit attributes, as these coefficients are higher than for meat, fruit or sides. Fig. 2 displays the statistical results graphically. As we would expect, the coefficients are highest for the lowest price and the largest sizes of salad and soup, and some meat. Individuals in our sample would like to get more soup and salad while paying the least amount of money.

Sides (rice and beans) were the least important in term of utility, relatively. As expected, less utility is achieved with higher prices and no portions of salad, soup or meat. It is important to note that absolute importance of a given characteristic cannot be determined from these regressions, though relative importance to the other attributes can. Since investigators set the levels, there is additional concern that this could make price artificially have more weight in respondent's decisions. However, we have pegged the lowest price level to the current price of the CP meals, and selected some higher prices to induce trading among the other attributes.

3.4. Sensitivity analyses

The conditional logit, another sensitivity analysis, using just the best or just the worst choices were consistent in their rankings with the rank-ordered logit. Almost none of the respondents said they would opt-out of eating at the CP when they did not like any of the menu offerings in the given profile (<6%). Therefore, the results of those who opted in are similar to the results for the full sample, the opt-out results are not shown.

3.5. Subgroup analyses

Three subgroup analyses were conducted: comparing men and women, district and by whether the person reported doing a health-promoting behavior in the last month. The results show no major differences between men and women, district and those who reported doing some healthy behaviors in the past four weeks. The relative importance of the price, salad and soup as part of the menu held across all specifications and subgroups (full results can be found in Appendix 1). We find the null hypothesis that the groups doing healthy behaviors and not have the same coefficients is rejected ($p = 0.0315$), for the neighborhoods, the null holds ($p = 0.811$) and for gender the null is rejected ($p = 0.0003$).

3.6. Willingness to pay

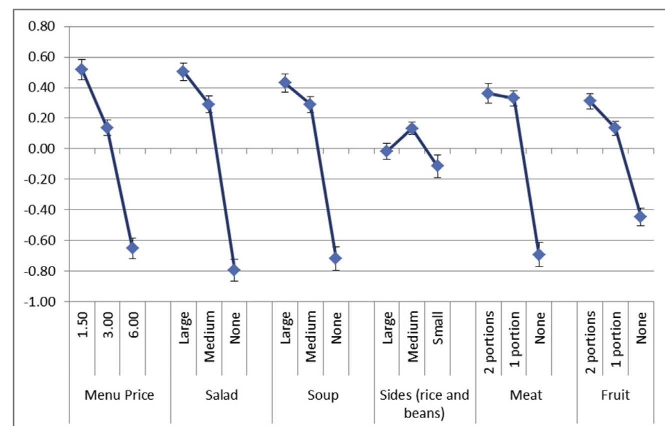
Using the monetary tradeoffs that can be inferred from the DCE results, we estimate the willingness to pay for certain attributes. From the survey conducted as part of this project, we know that the prices actually paid range from 1 to 3 Nuevos Soles (about a third to less than $1 USD). Willingness to pay is calculated as the ratio of the coefficient of the characteristic (e.g. large salad) to the price coefficient. This is the amount the person is willing to pay for a meal with a large salad, for example—the marginal utility for an increase in the attribute. The rank-ordered models were reanalyzed using a linear price factor. Table 4 shows the willingness-to-pay (WTP) for salad and fruit, two of the healthier menu additions that are of interest to policy makers, as well as informing the later intervention as part of the larger project. The WTP values indicate that a consumer would be willing to pay up to 2.62 Nuevos Soles for a meal with a large salad and up to 1.61 Nuevos Soles for a meal with two portions of fruit (1 Peruvian Nuevo Sol is worth about $0.32 USD). These figures should be interpreted with caution as they represent the upper bound on the estimates, as the upper level price is above the average price actually paid.

Table 3
Health status and perception of CP.

Health status, healthy activities and perceptions of the CPs	
Body Mass Index (self-reported)	26.7
Done following healthy activities, in the past 4 weeks:	**Percent**
Lost weight	22.9
Exercised more	19.0
Reduced salt	18.5
Reduced fat	34.3
Reduce sugar	24.8
Eat more fruit	27.5
Eat more vegetables	28.7
Consumption of fruits/vegetables	**Mean (SD)**
Number of days per week, eat fruit	4.2 (2.2)
Portions of fruit	2.3 (1.5)
Number of days per week, eat vegetables	4.9 (2.1)
Portions of vegetables	1.3 (0.8)
During the last week, between Monday to Friday, how many times did you:	**Mean (SD)**
Eat in CP	1.2 (1.8)
Buy at CP but eat at home	2.5 (2.0)
Buy food at market	0.1 (0.4)
Eat at restaurant	0.1 (0.7)
Cook at home	1.0 (1.4)
Don't eat lunch	0.0 (0.2)
Number of meals received at CP per day	3.3 (1.8)
Number of people eating those meals	3.3 (1.9)
Frequency eat at CP last 4 weeks	**Percent**
1–2 times/week	19.7
3–4 times/week	31.0
Almost Every Day	49.3
Paying for meals at CP	**Mean (SD)**
Always pay	357 (82.6)
Pay unless cooking or know cook	75 (17.4)
Never pay since always cook	0 (0.0)
Never pay	0 (0.0)
Average payment per menu, Nuevos Soles	1.9 (0.4)
How often do you do any of these activities:	**Percent saying sometimes, usually, always.**
Save some of the meal for dinner	49.5
Add vegetables	69.4
Add meat	55.1
Add eggs	68.5
Add fruit	43.8

4. Discussion

This study investigates the preferences for nutritional benefits delivered as part of the Comedores Populares organization in Peru. Based on the results of this DCE, we anticipate that CPs could add salads or fruit and increase the utility consumers gain from eating meals in the CPs. Results suggest that consumers are willing to pay between 1.6 and 2.6 Nuevos Soles for the additions of the largest portions of fruit and salad. Individuals with healthy behaviors and non-healthy behavior show similar patterns of individual valuation of attributes. These results are robust to several sensitivity tests conducted in the analysis.



Note: Y-axis is coefficient values from rank-ordered logit model. Number of observations (10368), log-likelihood (-4475.2) and pseudo R^2 (0.31)

Fig. 2. DCE results, rank-ordered logit, full sample.

In general, CP patrons think highly of the food. Users go almost every day and they usually buy food for other family members. The DCE results show that price has the most impact on utility, followed by fruit and salads. The willingness to pay results indicate that meals could include either fruits or salads (vegetables) and that consumers are willing to pay modest increases in price for the larger portions of these items. Sides are the least important in terms of utility. There is little difference in the relative value of the characteristics between those who would still buy the menu if these were the only choices presented to them (opt-in) and those who would opt out.

CPs offer meals to many low-income Peruvians, but could be improved to provide more healthy meal choices. Our approach contributes to the literature in several dimensions. We conduct a multi-profile BW DCE, of which there are very few of these in health: notably Fiebig et al. (2011) and Yoo et al. (2013). This DCE is also part of a larger project, the next phase of which will be to test out an intervention to increase the consumption of fruits and vegetables among low-income Peruvians. This is one of the few DCE that will directly inform a nutritional intervention for a low-income population.

Table 4
WTP for healthy menu items.

Willingness-to-pay for heallhier menu items, by subgroup, price in Nuevos soles.							
	Full sample	Cercado de Lima	San Juan de Miraflores	No healthy behavior	At least one healthy behavior	Male	Female
Salad							
Large	2.62	2.36	3.12	2.29	2.79	2.59	2.61
Medium	1.46	1.27	1.84	1.3	1.54	1.66	1.39
Fruit							
2 portions	1.61	1.65	1.59	1.56	1.63	1.1	1.75
1 portion	0.7	0.54	0.96	0.42	0.83	0.25	0.81

Note: Willingness to pay is calculated as the ratio of the coefficient of the characteristic (e.g. large salad) to the price coefficient. This is the amount the person is willing to pay to move to a meal with a large salad, for example. 1 Peruvian Nuevo Sol is worth about $0.32 USD.

The limitations of the study are that it was conducted in two main districts in Lima, Peru. Preferences for the nutritional benefits may differ in other districts or towns in Peru. Additionally, we did not survey the cooks directly in the CPs for the DCE. They may provide additional insights into barriers in providing healthier selections in the CPs.

4.1. Policy implications

The willingness to pay for meals with additional healthy items such as a large salad or fruit suggests that the CPs have the opportunity to add more nutritional impact to the meals. Other food vendors outside the CP system may be too expensive for the low-income individuals, increasing the potential for nutritional impact, and obesity reduction. Given this is the first study of nutritional preferences in grass-root organizations that offer food to low-income individuals, there is little in the literature with which to compare our results. From other literature on governmental nutrition programs, there is some evidence that changing what foods are available can impact nutritional quality in programs such as the US school lunch program (Jaime and Lock, 2009).

Among options for policy makers, support for the CP vendors is only one type of nutrition assistance program that could be offered. Introducing policy alternatives to increase the intake of nutritional food has been shown to be difficult. Taxing sugared beverages and other unhealthy food, framing choices, subsidizing healthy food, providing education and information have shown limited effectiveness (Cornelsen et al., 2015). Altering individual choices of food is difficult and individuals' response to traditional taxes, information, and incentive policies tend to be less sensitive than expected. In terms of providing the best nutritional impact for the least amount of governmental expenditure, officials could provide cash instead of a subsidy in the form of the CPs. Since everyone buys food, the deadweight loss associated with a cash transfer would be low to none, which is why every country has some type of cash transfer or food stamp program.

Understanding consumer preferences for changes in the prices, quality and foods served in the CPs could both improve nutrition among the poor, as well as make the CP program more efficient. Since the CPs receive government subsidies, and the program is intended to serve low-income clients, there is little incentive for each CP to innovate in terms of menu offerings to gain market share. In a more competitive environment, CPs could move the other direction, towards lower cost fast food that may help them gain market share. CPs may be justified as a way to empower women in the low-income communities, which has been the case for CPs in Peru for the last three to four decades. The CPs in their current form, are a delivery system for subsidized food, and could be an efficient way of providing access to healthier foods, since the system is already in place and economies of scale can be achieved. CPs can also provide a ready vehicle for promoting healthier items such as salads and fruits—promotion that could be far more difficult in a cash-transfer program, or other type of direct transfer food assistance program.

CPs are already a part of the social fabric in Peru's low-income districts, and could also be a vehicle for providing nutritional education as part of a larger strategy to combat obesity. We found that the respondents value fruits and salads, and that they would be willing to pay for the upgrades in the meals. Therefore, the local governments could use the information found here to improve help the CPs meet nutritional goals.

Acknowledgments

This project was funded with a grant from the International Development Research Center, project 106887-001, as part of their Non-communicable Disease Prevention Program.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2015.06.033.

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